Missouri
Department of
Natural Resources

DRAFT MOUND BRANCH TMDL
PUBLIC COMMENTS

Public Notice
October 29, 2009 – December 14, 2009

Mound Branch
WBID # 1300

Bates County, Mo.

Missouri Department of Natural Resources
Water Protection Program
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November 23, 2009

Mr. John Hoke
Missouri Department of Natural Resources
Water Protection Program
Water Quality Monitoring and Assessment Section
P.O. Box 176
Jefferson City, MO 65102

Subject: Draft Mound Branch Total Maximum Daily Load Report

Dear Mr. Hoke:

On behalf of the City of Butler, Geosyntec Consultants (Geosyntec) appreciates the opportunity to submit this comment letter addressing the City's concerns regarding development of the draft Mound Branch Total Maximum Daily Load (TMDL) report and its impacts on the City of Butler (City) Wastewater Treatment Plant (WWTP). The TMDL seeks to place extremely stringent limits on the Butler WWTP using an unverified model despite recognition that neither Mound Branch upstream of the WWTF outfall nor nearby reference streams attains the dissolved oxygen (DO) criterion targeted by the TMDL. The City is concerned that wasteload allocations stipulated by the TMDL are significantly lower than wasteload allocations issued to other WWTPs in Missouri that discharge to low DO streams.

The primary observations, concerns and objections regarding the TMDL are listed as follows:

- The water quality data collected through the TMDL process indicates that the Butler WWTP is not the cause of low DO in Mound Branch.
- DO measurements in Mound Branch upstream of the Butler WWTP were either as low as or at times lower than DO measurements downstream from the Butler WWTP discharge.
- DO in streams such as Mound Branch is naturally below the 5.0 mg/L DO criterion in summer, low-flow conditions.
- The TMDL does not demonstrate that the immense cost of a Butler WWTP upgrade required to meet the TMDL wasteload allocations would result in a significant DO increase in Mound Branch.

- The Butler WWTP currently must meet stringent "10/15" mg/L 5-day biochemical oxygen demand (BOD_5) water quality-based effluent limits and consistently discharges BOD_5 and total suspended solids below 5 mg/L.

- The wasteload allocations proposed in the TMDL are unprecedented and likely cannot be consistently achieved with any technology used to treat domestic wastewater.

- Wasteload allocations for nutrients are not supported by water quality criteria approved by the Missouri Clean Water Commission.

- The QUAL2K model used to develop the wasteload allocations appears to be unverified and there are other aspects of the model such as sediment oxygen demand processes that should be reevaluated.

- The need for alternative dissolved oxygen criteria and/or designated uses is apparent.

We request that the Department of Natural Resources (Department) consider the following specific comments before formulating the final TMDL for Mound Branch.

1. ***Butler WWTP wasteload allocations are likely unachievable and unmerited***. Several of the wastewater treatment plant wasteload allocations may be unachievable, particularly after conversion to permit limitations. Installation of tertiary filtration or membrane filtration may not meet the BOD and total suspended solids reduction requirements. In addition, the nutrient limitations are beyond the state of the practice.

   The draft TMDL does not conclusively demonstrate that nutrient limits, if achieved, will meet a DO concentration of 5 mg/L. Several data points collected during the 2004 stream survey at locations upstream of the Butler WWTP feature nutrient and BOD concentrations comparable to wasteload allocations yet support DO concentrations less than 5 mg/L.

   Mound Branch is listed for a low DO impairment, not excessive nutrients. Given the considerable capital outlay represented by proposed nutrient wasteload allocations the City believes the Department should remove proposed nutrient removal requirements from the TMDL.

2. ***Wasteload allocations for nutrients are not supported by water quality criteria approved by the Missouri Clean Water Commission***. Included within Tables 7 and 8 of the draft TMDL are wasteload allocations of 10.1 lbs/day (0.8 mg/L) for total nitrogen and 1.15 lbs/day (91 ug/L) for total phosphorus, respectively. It is not clear what regulatory basis supports the prescribed nutrient wasteload allocations. The TMDL qualitatively ties nutrients to the DO impairment; however, limited quantitative analysis was provided to demonstrate that nutrient wasteload allocations are needed to address the DO impairment. We note that Mound Branch is not identified by the Department as being impaired by unacceptably high nutrient concentrations, and that the State of Missouri has not adopted numeric (304(a)) nutrient criteria for flowing waters. The nutrient wasteload allocations are beyond the limits of conventional wastewater treatment technology and represent an unachievable target for wastewater utilities. It is not clear what affordable technologies are available that can meet the prescribed nutrient wasteload allocations.

   In addition, the load duration curve method for identifying nutrient allocations does not provide a linkage between nutrients and DO or the aquatic life beneficial use. Therefore, the applicability of this technique is questionable and should be reconsidered.

3. ***The need for alternative criteria and/or designated uses is apparent***. Throughout the TMDL, the Department mentions plans to possibly pursue development of alternative dissolved oxygen criteria for Mound Branch and other ecoregional streams. The City endorses this effort. Even with advanced treatment, achieving proposed wasteload allocations listed below may not be technically possible or affordable.

   Dissolved oxygen concentrations well below 5 mg/L have been documented by the Department and contractors within Little Drywood Creek, the biocriteria reference stream for Ecological Drainage Unit (EDU) 15. EDU-15 also contains Mound Branch. Defined within 10 CSR 20-7.031, reference streams are "stream reaches determined by the department to be the best available representatives of ecoregion waters in a natural condition, with respect to habitat, ***water quality***, biological integrity and diversity, watershed land use and riparian conditions [emphasis added]."

   Monitoring locations located upstream of the Butler WWTP and within Little Drywood Creek feature BOD, nitrogen, phosphorus, and suspended solids concentrations comparable to, or less than, concentrations prescribed as wasteload allocation s in the Mound Branch TMDL. Upstream and reference stream monitoring locations also feature DO concentrations less than 5 mg/L. Even if wasteload allocations proposed in the Mound Branch TMDL could

technologically be achieved, there is a significant compilation of data suggesting that the statewide DO criteria of 5 mg/L would not be attained.

The City therefore requests that the Department abstain from issuing wasteload allocations prescribed in the TMDL until alternative DO criteria and/or designated uses are developed for Mound Branch.

4. ***The water quality model used to develop wasteload allocations appears to be unverified.*** The Qual2K model used to demonstrate that proposed wasteload allocations will meet water quality standards is calibrated to a single dataset (2003). It is not clear why an additional and available dataset (2004) was not used to verify the calibrated model. While the calibrated model appears reasonable and accurate, the Department's Wasteload Allocation Project Procedure[1] document specifies two (2) surveys be conducted to calibrate and verify a receiving stream model. Current guidance distributed by the MDNR Permits Section requires permittees to conduct two stream surveys when applying Qual2K or Qual2E. Given the significant capital investment associated with attempting to meet proposed wasteload allocations (*non-detectable BOD*), the City believes the Department should verify the TMDL model with at least one additional dataset, before prescribing such stringent permit limits.

5. ***Wasteload allocations for Biochemical Oxygen Demand are not clear***. Included within Table 5 of the draft TMDL is a 'BOD' wasteload allocation of 18.8 lbs/day (1.5 mg/L, *non-detect*). The following technical, regulatory, and socioeconomic comments related to BOD values referenced in the draft TMDL are offered:

    - Nomenclature Clarification – Is the wasteload allocation for 'BOD' in Table 5 expressed as CBOD Ultimate, BOD Ultimate, or a 5-day value? We note the Qual2K model used to develop the wasteload allocation lists a 7 mg/L value in the 'Fast-CBOD' input cell. Fast –CBOD in the Qual2K framework is soluble CBOD Ultimate that is relatively labile in the water column. The TMDL is not clear how this value is converted into a typically permitted parameter.

6. ***Sediment Oxygen Demand is not mechanistically simulated in the TMDL model*** – a negligible SOD flux of 0.05 mgO_2/m^2/day is explicitly assumed in the TMDL allocation model while a SOD flux of 1.8 mgO_2/m^2/day is used during model calibration. Differences in organic carbon and nitrogen flux to the sediments between calibration and allocation

[1] MDNR. 2003. Project Procedure for Wasteload Allocation/Special Stream Studies. Environmental Services Program. Jefferson City, MO.

conditions do not appear to support such a significant decrease in SOD. It is not clear why the sediment diagenesis model in Qual2K was not used to mechanistically predict SOD for both calibration and allocation model runs. The sediment diagenesis model is a major feature of Qual2K and provides a chemical and physical basis for changes in SOD in response to organic loading. We request the TMDL model be recalibrated and applied using the sediment diagenesis model.

In addition, we note that the 2003 stream survey describes Mound Branch reaches downstream of the WWTP as having mostly a silt substrate with organic debris and submerged logs. The calibration and TMDL model appear to estimate a low percentage of bottom area expressing SOD (30%-40%). It is likely that SOD generated in Mound Branch occurs over more than 40% of the wetted perimeter.

7. ***Turbidity is not a pollutant***. Page 15 lists turbidity as a pollutant potentially reducing DO concentration in the water column. Turbidity is not a pollutant and therefore we request that references to turbidity be removed from the TMDL. Depending on the material generating turbidity values, DO may increase or decrease, on a site-specific basis.

   Furthermore, Section 8 fails to provide a clear and quantitative linkage between the listed cause of impairment (dissolved oxygen), the beneficial use, fine particle size, turbidity, and total suspended solids. We request the approach for determining TSS criteria and wasteload allocations be removed from the TMDL as no quantitative linkage between TSS, dissolved oxygen, beneficial use, or narrative criteria violation has been demonstrated.

8. ***Revised water quality-based effluent limits were recently issued.*** In 2004, the Department issued stringent average monthly limits for BOD_5 (10 mg/L) and TSS (15 mg/L). The basis for these limits were provided by previous stream surveys and modeling efforts performed by the Department. Five years later, additional surveys and modeling have yield a significantly different and more stringent estimate of assimilative capacity. It is not clear why these estimates differ. Given the documented uncertainty in load capacity, the City is concerned that future assessments may demonstrate that limits proposed in the TMDL are unnecessary.

9. ***Adaptive management strategies should be used for Mound Branch***. As discussed, there are substantive uncertainties associated with the Mound Branch TMDL and load capacity estimates. These issues coupled with the likely unachievable wasteload allocations justify the use of adaptive management for TMDL implementation. Additional water quality data and modeling efforts are needed to set technically defensible wasteload allocation targets. In

addition, the Department is considering revisions to the DO criteria within the next few years. Therefore, we recommend that the implementation plan within the TMDL includes an adaptive management approach and reopener provisions so that the load and wasteload allocations are reevaluated within the near-term.

Given the complexity of this issue and potential ramifications, the City of Butler requests a meeting to discuss the TMDL directly with the Department. The City of Butler appreciates the opportunity to express the significant concerns we have to the Department.

Sincerely,

Tom Wallace
Senior Project Manager

cc: Mark Arbuthnot, City of Butler
Trent Diehl, City of Butler

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December 11, 2009

Mr. John Hoke
Department of Natural Resources
Water Protection Program
Water Quality Monitoring and Assessment Section
P.O. Box 176
Jefferson City, MO 65102

Subject: 2nd Comment Letter: Draft Mound Branch Total Maximum Daily Load Report

Dear Mr. Hoke:

On behalf of the City of Butler, Geosyntec Consultants (Geosyntec) appreciates the opportunity to submit this second comment letter further addressing the City's concerns regarding development of the draft Mound Branch Total Maximum Daily Load (TMDL) report and its impacts on the City of Butler (City) Wastewater Treatment Plant (WWTP). This letter requests specific language changes in the TMDL that were discussed in our December 9, 2009 meeting at your office. This letter is a supplement to our November 23, 2009 comment letter and does not modify any of the comments included in our first comment letter.

The requested language changes are intended to help assure that the TMDL language accurately reflects the Missouri Department of Natural Resources (MDNR's) approach that the Butler Wastewater Treatment Plant NPDES effluent limitations will not be modified through the TMDL until: 1) site specific dissolved oxygen criteria have been promulgated and 2) the comprehensive evaluation of point and non-point source loads currently planned by Osage Valley Resource Conservation and Development Council has been completed. The requested draft TMDL language changes that we identified to better confirm MDNR's approach are as follows:

Item 1: Page 8, Section 3.1, Point Sources, paragraph 2:

We request removing the final sentence which reads as follows:

> "The five-year permit expires Sept. 2, 2009 and will likely be renewed with effluent limits derived from wasteload allocations contained in this TMDL".

As we discussed, reference to the permit expiring on September 2, 2009 is no longer accurate.

Item 2: Page 20, Section 11, Monitoring Plan for TMDLs Developed under Phased Approach, paragraph 1, sentence 1.

To reflect our discussions, we request the following revisions to the first sentence of the paragraph (deletions are in strikethrough and additions are in bold):

"Post-TMDL monitoring will be scheduled and carried out by the department about three years after the TMDL is approved, or in a reasonable period of time following ~~the~~ **any** compliance schedule outlined in the permit **prompted by the TMDL** and the application of any new effluent limits."

Item 3: Page 20, Section 11, Monitoring Plan for TMDLs Developed under Phased Approach, paragraph 1, sentence 2.

We request removing this sentence:

"The Missouri State Operating Permit for the city of Butler's wastewater treatment plant expired on Sept. 2, 2009, and will be reissued with new permit limits based on the waste load allocation developed in this TMDL."

As we discussed, reference to the permit expiring on September 2, 2009 is no longer accurate.

Item 4: Page 20, Section 11, Monitoring Plan for TMDLs Developed under Phased Approach, paragraph 2.

We agree with your suggestion in the meeting that this paragraph could be moved to Section 12 (Implementation Plans).

Item 5: Page 21, Section 12, Implementation Plans

To add additional emphasis that the TMDL should be based on naturally attainable dissolved oxygen criteria, we recommend the following sentence be inserted after the second sentence of the paragraph which ends with "similar streams".

"Revised dissolved oxygen criteria may better reflect natural stream reaeration conditions to assure that treatment plant effluent limits are based on meeting dissolved oxygen criteria that are naturally attainable and realistic."

Item 6: Page 21, Section 12.1, Implementation Plans/Point Sources, sentence 1

We request removing this sentence:

"This TMDL will be partially implemented through permit action. The permit for the City of Butler's treatment plant expired Sept. 2, 2009, with renewal pending the determination of new effluent limits based on waste load allocations developed for the Mound Branch TMDL."

As we discussed, reference to the permit expiring on September 2, 2009 is no longer accurate.

Item 7: Page 23, Section 13, Reasonable Assurances, sentence 2

To reflect our discussions, we request the following revisions to the first sentence of the paragraph (deletions are in strikethrough and additions are in bold):

"The department has the authority to issue and enforce State Operating Permits. **The authority to include** ~~Inclusion of~~ effluent limits determined from the wasteload allocations established by the TMDL modeling into a state permit, and monitoring of the effluent and receiving stream reported to the department, should provide reasonable assurance that instream water quality standards will be met."

This modification is requested to make certain there is not an incorrect inference that the TMDL wasteload allocations will automatically be used to develop effluent limits for the Butler WWTP.

We greatly appreciate the opportunity to discuss the Mound Branch draft TMDL and better understand MDNR's planned approach to not automatically apply TMDL wasteload allocations to the Butler NPDES permit until further planned water quality evaluations referenced earlier in this letter are completed. Please let us know of any questions or additional information you may need and thanks again for your availability to address the City's comments and concerns regarding the draft TMDL.

` Sincerely,

Tom Wallace
Senior Project Manager

cc: Mark Arbuthnot, City of Butler
Trent Diehl, City of Butler
Dean Willis, P.E. Allgeier Martin

STATE OF MISSOURI
Jeremiah W. (Jay) Nixon, Governor • Mark N. Templeton, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.mo.gov

March 10, 2010

Mr. Tom Wallace
Geosyntec Consultants
1123 Wilkes Boulevard, Suite 400
Columbia, MO 65201

RE: Response to Comments on the Mound Branch Total Maximum Daily Load

Dear Mr. Wallace:

The Missouri Department of Natural Resources (Department) appreciates the comments provided by Geosyntec Consultants, submitted on behalf of the City of Butler, on the draft Mound Branch Total Maximum Daily Load (TMDL). This letter responds to comments (some paraphrased here in the interest of brevity) received from Geosyntec on November 29, 2009 and December 11, 2009. Please find herein the Department's response to each comment and the location of the revision (if applicable) within the final document as it will be submitted to the U.S. Environmental Protection Agency (EPA).

November 29, 2009 Comments:

Comment #1: *Butler WWTP wasteload allocations are likely unachievable and unmerited.*

The Department is required to develop wasteload allocations (WLAs) that are protective of water quality without regard to cost or available treatment technology. Should WLAs result in effluent limitations that are beyond the limits of current treatment technology, the Department may develop a phased approach to implementation of effluent limitations through the use of the best available treatment technology. This approach can be implemented either within the operating permit or through a settlement agreement. As discussed in the December 9, 2010 meeting with the City of Butler, Geosyntec, and the Department, Section 12 (Implementation Plans) of the TMDL document has been revised to include a phased approach to TMDL WLA implementation.

The draft TMDL and supporting QUAL2K and load duration curve models demonstrate that reductions in carbonaceous biochemical oxygen demand (CBOD), nutrients (total nitrogen and total phosphorous), and total suspended solids (TSS) will result in attainment of applicable water quality standards (WQS), including DO. WLAs set at levels that will attain WQS must be included in the TMDL. Therefore, the Department will not remove the proposed requirements from the document. However, as noted above, the implementation of WLAs for CBOD, TSS, and nutrients will be phased into the City of Butler's WWTF operating permit.

Comment #2: *Wasteload allocations for nutrients are not supported by water quality criteria approved by the Missouri Clean Water Commission.*

It is recognized by EPA in their National Nutrient Strategy[1], and widely understood in general, that excessive nutrients in a water body can lead to potentially harmful algal blooms which can in turn contribute to low DO conditions. The TMDL sets targets to reduce nutrient concentrations to a level that will decrease algal productivity, thereby reducing the algal biomass available for decay and decomposition. The reduction of available algae will lead to a reduction in oxygen demanding substances in the water column (CBOD) and on the stream bottom as sediment oxygen demand (SOD).

It is within the authority of the Department to set WLAs for pollutants that cause or contribute to the impairment of a water body. According to 40 CFR 122.44(d)(l)(i), "Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state WQS, including state narrative criteria for water quality." Furthermore, this TMDL was developed to comply with Sections 303(d) and 302(a) of the Clean Water Act which dictates that when technology-based effluent limitations result in impaired water quality and non-attainment of designated uses, water quality-based effluent limitations shall be established. Domestic wastewater treatment facility effluent contains nutrient concentrations at levels that can cause or contribute to algal growth, respiration, and decomposition in the receiving stream. These conditions in turn can cause or contribute to violations of the state minimum water quality criterion for DO.

The QUAL2K model used for the Mound Branch TMDL recognizes that total nitrogen and total phosphorus can cause or contribute to low DO issues in the stream through algal growth, respiration, and decomposition. Because total nitrogen and total phosphorous are addressed in the model, WLAs are required for the City of Butler's WWTF. Development of TMDL WLAs must ensure attainment and compliance with applicable WQS per 40 CFR 130.7(c). As a result, TMDL WLA development is conducted without consideration of wastewater treatment technology or cost. However, the implementation section of the TMDL outlines a phased implementation approach to pollutant reduction. This phased approach stipulates that initial reductions to limits for CBOD and TSS should result in attainment of numeric and narrative WQS. In the event that post-TMDL monitoring indicates that reductions in CBOD and TSS from the WWTF are not achieving the desired improvements to water quality, additional conditions, including effluent limits for nutrients, may be placed in the operating permit for the City of Butler's WWTF. The Department typically waits at least three years from the end of a permit compliance schedule or facility upgrade before assessing the impact of facility improvements on in-stream water quality.

The load duration curve method does not need to establish a linkage between nutrients and low DO. This linkage has already been established by the QUAL2K model. The load duration curves provide a mechanism to establish nutrient loadings to water bodies at higher flows not simulated by the QUAL2K model. The effect of pollutant reductions at all flows should be nutrient concentrations in-stream that do not cause or contribute to the low DO impairment.

Comment #3: *The need for alternative criteria and/or designated uses is apparent.*

The final TMDL has been revised to include amended implementation language acknowledging that low DO is an issue in Mound Branch both upstream and downstream of the WWTF. The new language also acknowledges issues regarding low DO as a natural background condition in prairie streams in this ecological region. The Department may develop revised DO criteria for Mound

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[1] National Strategy for the Development of Regional Nutrient Criteria (June 1998). EPA 822-R-98-002.

Branch and similar streams during future triennial reviews of the WQS if resources are available. Additional monitoring and analysis will determine whether the DO minimum criterion of 5 mg/L is appropriate, or if a new site-specific DO criterion is required. The Department acknowledges that should revised criteria be developed, a revised Mound Branch TMDL may be necessary. It also acknowledges; however, that the revised criteria may result in no impact for Mound Branch and that new loading calculations may not differ or offer relief from what is currently contained in this TMDL.

In reviewing the available historical water quality data for Mound Branch, the Department found seven water quality samples above the City of Butler's WWTF with DO concentrations below the minimum criterion that also reported concentrations of total nitrogen, total phosphorus, and CBOD. In most cases, CBOD was at low or nondetectable levels, but nutrient concentrations were above load capacity concentrations necessary to attain the minimum DO criterion during low flow conditions. While this may mean that WLAs in the TMDL might not result in consistent attainment of the DO criterion, it may just as likely indicate that nutrients are the driving factor behind low DO concentrations in Mound Branch.

In regard to Little Drywood Creek, the Department concurs that this reference stream does at times exhibit low DO concentrations below the 5 mg/L minimum criterion. However, modeled DO and nutrient relationships for Little Drywood Creek were not available from which to determine whether the water body would serve as a suitable reference stream for Mound Branch. Therefore, EPA nutrient ecoregion reference concentrations were used to set TMDL nutrient targets for Mound Branch.

Comment #4: *The water quality model used to develop wasteload allocations appears to be unverified.*

The QUAL2K model for 2003 was not validated with the 2004 data because the 2004 sampling was not representative of the critical condition. For the purposes of the TMDL, the model was used to establish WLAs protective of water quality under critical low-flow conditions. The model is not designed to be used to describe the dynamics of the system under varying flow and climatic conditions; hence, validation under a different condition is not necessary. A comparison of conditions during the two studies is shown below:

	August 2003	**August 2004**
Average Water Temperatures		
MB1	25.0	20.3
MB2	25.0	22.6
MB3	24.4	21.1
Flow at MB1 (1.2 mi U/S of WWTP)	0.06 cfs	0.42 cfs
Air Temperature (Butler4W)		
Minimum	62 (8/4) 64 (8/5)	54 (8/16) 56 (8/17)
Maximum	97 (8/4) 99 (8/5)	80 (8/16) 92 (8/17)
Average	79 (8/4) 81 (8/5)	67 (8/16) 75 (8/17)
Antecedent Rainfall (30 days)	1.61 in. (7/4 – 8/4)	4.92 in. (7/15-8/15)

Comment #5: *Wasteload allocations for Biochemical Oxygen Demand are not clear.*

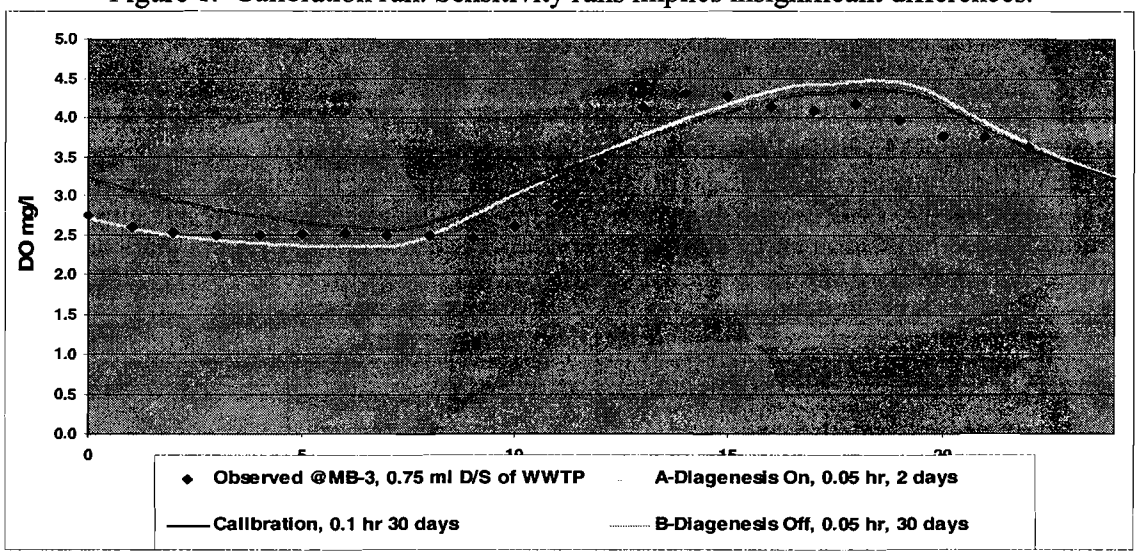
The WLA for BOD in Table 5 should be identified as $CBOD_5$, which represents a 5-day CBOD. Table 5 has been revised to reflect this change. Please note that the conversion of WLAs to permit limits is the purview of the Water Protection Program's Permits and Engineering Section. Should you have questions regarding the determination of permit effluent limits, please contact Mr. Refaat Mefrakis, Permits and Engineering Section Chief, at (573) 526-2928 or by email at efaat.mefrakis@dnr.mo.gov.

Comment #6: *Sediment Oxygen Demand is not mechanistically simulated in the TMDL model.*

The purpose of the TMDL model allocation run is to establish WLAs for CBOD and nutrients that will result in attainment of WQS downstream of the City of Butler's WWTF. The model allocation run discounts the effects of SOD, hence a minimal SOD flux was prescribed. However, if the WLA results are desired to be more conservative, mechanistically modeling the SOD would likely result in more stringent CBOD limits, lower than what is indicated in the TMDL. Recalibration of the QUAL2K model is not necessary and would not change the results of the analysis.

A 30-40 percent SOD bottom coverage is a less conservative assumption. What is described in the 2003 water quality report is the stream condition at the sampling site near the U.S. Highway 71 bridge crossing approximately 1 mile below the City of Butler's WWTF. Results of additional sensitivity analysis are shown in the following figures:

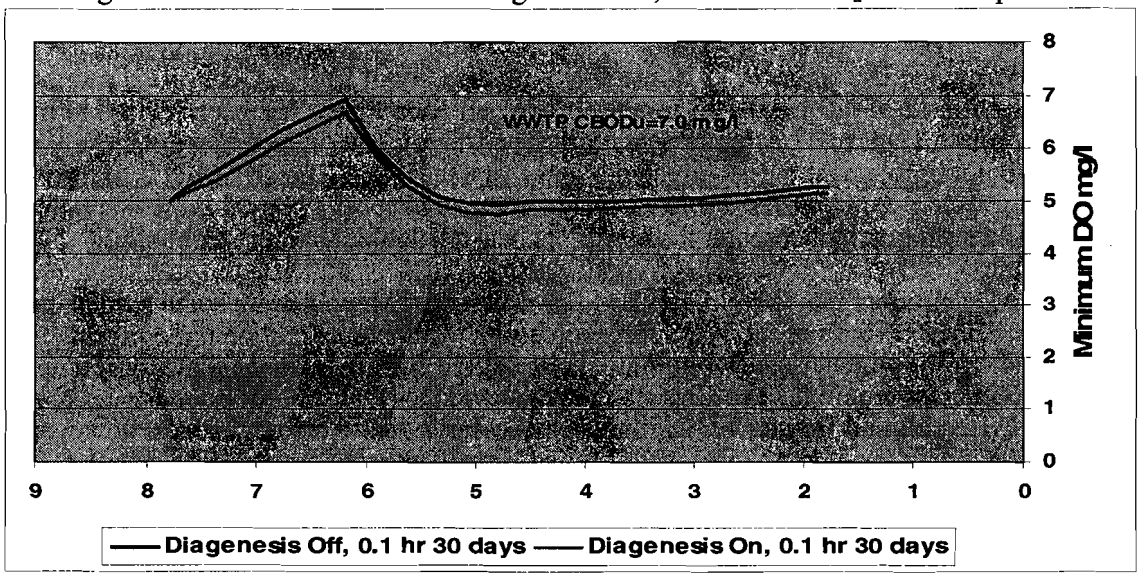
Figure 1. Calibration run. Sensitivity runs implies insignificant differences.



Percentage Errors of Simulated DO at MB-3 (0.75 mi D/S of WWTF)

	Calibration	Diagenesis On, 0.05 hr, 2 days	Diagenesis Off, 0.05 hr, 30 days
Minimum DO	5 %	-4 %	5 %
Maximum DO	1 %	4 %	1 %
Average DO	5 %	3 %	5 %

Figure 2. Allocation run. With "diagenesis on", a lower $CBOD_u$ limit is required.



Comment #7: *Turbidity is not a pollutant. Turbidity is not a pollutant and therefore we request that references to turbidity be removed from the TMDL. Furthermore, Section 8 fails to provide a clear and quantitative linkage between the listed cause of impairment (dissolved oxygen), the beneficial use, fine particle size, turbidity, and total suspended solids. We request the approach for determining TSS criteria and wasteload allocations be removed from the TMDL as no quantitative linkage between TSS, dissolved oxygen, beneficial use, or narrative criteria violation has been demonstrated.*

The inclusion of turbidity as a pollutant was an oversight carried over from a previous draft. References to turbidity in the TMDL have been changed to "suspended particles of organic matter" which more closely describes the organic sediment input to the stream. TSS is comprised of both volatile (organic) and non-volatile (inorganic) suspended solids. Volatile suspended solids (e.g. algae or sludge) consume oxygen during decomposition and can contribute to SOD.

The water quality target for TSS was derived based on a reference approach and targeted the 25th percentile of TSS measurements in the geographic region in which Mound Branch is located. Reductions in TSS will result in reductions in both volatile and non-volatile suspended solids. Reductions in TSS, especially the volatile suspended solids portion, should result in less oxygen demanding substances in the water column and sediments of Mound Branch. A reduction in oxygen demanding substances should result in attainment of the DO minimum criterion which is protective of the aquatic life designated use.

Comment #8: *Revised water quality-based effluent limits were recently issued.*

The Missouri State Operating Permit (MSOP) issued on September 3, 2004 for the City of Butler's WWTF contained effluent limits for BOD_5 and TSS that were derived using previous stream surveys and QUAL2E modeling results. The more recent operating permit issued February 11, 2010 retained existing effluent limitations for these parameters. Additional water quality data for nutrients and updated QUAL2K modeling required for the Mound Branch TMDL have resulted in more stringent WLAs for CBOD, TSS, and nutrients. As referenced in the response to Comment #1, these more stringent WLAs will be implemented through a phased approach.

Comment #9: *Adaptive management strategies should be used for Mound Branch.*

As discussed during the December 9, 2010 meeting with the City of Butler, Geosyntec, and the Department, Section 12 of the TMDL document (Implementation Plans) has been revised to include a phased approach to TMDL WLA implementation. The Department intends to work closely with the City of Butler to implement the requirements found in the Mound Branch TMDL. In the event that nutrient limits do become necessary, the Department may support a phased implementation approach to effluent limitations through the use of the best available treatment technology.

In addition, the Department may develop revised DO criteria for Mound Branch and similar streams during future triennial reviews of the WQS if resources are available. Additional monitoring and analysis will determine whether the DO minimum criterion of 5 mg/L is appropriate, or if a new site-specific DO criterion is required. The Department acknowledges that should revised criteria be developed, a revised Mound Branch TMDL may be necessary. It also acknowledges; however, that the revised criteria may result in no impact for Mound Branch and that new loading calculations may not differ or offer relief from what is currently contained in this TMDL.

The Department understands that resources are limited and that communities are sometimes hard pressed to meet the demands of water and wastewater system improvements. I invite you to contact the Department's Financial Assistance Center to discuss grant and low-interest loan options that may be available to the city should wastewater system improvements be necessary. To reach the Financial Assistance Center, you can call (573) 751-1192 and ask for either Mr. Doug Garrett or Ms. Traci Newberry, or email Mr. Garrett at doug.garrett@dnr.mo.gov. You can also find them on the web at http://www.dnr.mo.gov/env/wpp/srf/index.html.

December 11, 2009 Comments:

The following responses address comments submitted by Geosyntec, on behalf of the City of Butler, via letter dated December 11, 2009 and titled "2nd Comment Letter: Draft Mound Branch Total Maximum Daily Load Report". The letter was a follow-up to a December 9, 2009 meeting between the City of Butler, Geosyntec, and the Department.

Prior to addressing individual items of concern, the December 11, 2009 letter states that "the requested language changes are intended to help assure that the TMDL language accurately reflects the Department's approach that the City of Butler's WWTF National Pollutant Discharge Elimination System effluent limitations will not be modified through the TMDL until: 1) site specific DO criteria have been promulgated; and 2) the comprehensive evaluation of point and non-point source loads currently planned by Osage Valley Resource Conservation and Development Council has been completed." The Department acknowledges that site-specific DO criteria may be necessary for Mound Branch. However, should water quality studies indicate the existing minimum criterion of 5 mg/L is appropriate, the WLAs found in the Mound Branch TMDL will be applied through modification of the City of Butler's WWTF MSOP. As previously mentioned in earlier responses, the implementation of revised effluent limitations will be conducted using a phased approach. Also,

any modification of effluent limitations to reflect WLAs found in the Mound Branch TMDL, or those based on site-specific DO criteria, need not wait until completion of the comprehensive source study being conducted by the Osage Valley Resource Conservation and Development Council.

Item #1 – *Page 8, Section 3.1, Point Sources, paragraph 2. We request removing the final sentence.*

The sentence in question has been removed. All discussion on TMDL implementation activities for point sources, including the City of Butler's WWTF, can now be found in Section 12.1 of the document.

Item #2 – *Page 20, Section 11, Monitoring Plan for TMDLs Developed under Phased Approach, paragraph 1, sentence 1. To reflect our discussions, we request the following revisions to the first sentence of the paragraph.*

This section has been revised to clarify that follow-up monitoring conducted by the Department will occur approximately three years after the TMDL is approved, or in a reasonable period of time following any TMDL compliance schedule outlined in the permit and the application of any new effluent limits.

Item #3 – *Page 20, Section 11, Monitoring Plan for TMDLs Developed under Phased Approach, paragraph 1, sentence 2. We request removing this sentence.*

The sentence in question has been removed. All discussion on TMDL implementation activities for point sources, including the City of Butler's WWTF, can now be found in Section 12.1 of the document.

Item #4 – *Page 20, Section 11, Monitoring Plan for TMDLs Developed under Phased Approach, paragraph 2. We agree with your suggestion in the meeting that this paragraph could be moved to Section 12 (Implementation Plans).*

The paragraph in question concerns in-stream monitoring of Mound Branch conducted by the City of Butler's WWTF. The Department agrees that the paragraph is better suited for Section 12.1 of the document (Implementation Plans, Point Sources).

Item #5 – *Page 21, Section 12, Implementation Plans. To add additional emphasis that the TMDL should be based on naturally attainable dissolved oxygen criteria, we recommend the following sentence be inserted after the second sentence of the paragraph which ends with "similar streams".*

The Department appreciates the suggested language for this section. Most of the language proposed by Geosyntec under this item has been added to Section 12, Implementation Plans.

Item #6 – *Page 21, Section 12.1, Implementation Plans/Point Sources, sentence 1. We request removing this sentence.*
The sentence in question has been removed. Portions of this section have also been updated to maintain consistency with other TMDLs that have similar impairments and sources.

Item #7 – *Page 23, Section 13, Reasonable Assurances, sentence 2. To reflect our discussions, we request the following revisions to the first sentence of the paragraph.*

The wording referenced in Item #7 has not been revised. The Department believes the wording on reasonable assurances is a simple statement of fact and does not imply that the WLAs found in the TMDL will automatically be used to develop effluent limits for the City of Butler's WWTF MSOP.

Thank you again for your comments. The Department is committed to working with the City of Butler toward implementing this TMDL once it is approved by EPA. If you should have questions or would like to discuss this TMDL further, please contact me at (573) 526-1446, john.hoke@dnr.mo.gov or by mail at the Missouri Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, Missouri 65102.

Sincerely,

WATER PROTECTION PROGRAM

John Hoke, Chief
TMDL Unit

JH:apl

c: Mr. Mark Arbuthnot, City of Butler
Mr. Trent Diehl, City of Butler

MPUA
Missouri Public Utility Alliance

November 23, 2009

Mr. John Hoke
Department of Natural Resources
Water Protection Program
Water Quality Monitoring and Assessment Section
P.O. Box 176
Jefferson City, MO 65102

RECEIVED
2009 NOV 25 PM 1:55
WATER PROTECTION PROGRAM

Re: Draft Mound Branch Total Maximum Daily Load Report

Dear Mr. Hoke:

The Missouri Public Utility Alliance (MPUA) appreciates the opportunity to submit comments regarding the issuance of draft regulatory documents for our member municipalities. MPUA serves over 100 municipal utilities in Missouri, representing over 1.2 million ratepayers. This comment letter summarizes our concerns we have regarding development of the draft Mound Branch Total Maximum Daily Load (TMDL) report and its impacts on the City of Butler's Wastewater Treatment Plant (WWTP). The City of Butler is a member of MPUA.

Through our review of the TMDL and through recent correspondence with the City and their consultant (Geosyntec Consultants) we recognize that the TMDL seeks to place extremely stringent limits on the City's Wastewater Treatment Facility (WWTF) with an unverified model. We understand that neither Mound Branch upstream of the Butler WWTF outfall nor nearby reference streams attains the dissolved oxygen (DO) criterion targeted by the TMDL. We also understand that the wasteload allocations stipulated by the TMDL are significantly lower than wasteload allocations issued for other WWTFs in Missouri that discharge to low DO streams. MPUA concurs with Geosyntec Consultant's primary concerns regarding the TMDL. They include:

— The water quality data collected through the TMDL process indicates that the Butler WWTF is not the cause of low DO in Mound Branch.

— DO measurements in Mound Branch upstream of the Butler WWTF were either as low as or at times lower than DO measurements downstream from the Butler WWTF discharge.

— DO in streams such as Mound Branch is naturally below the 5.0 mg/L DO criteria in summer, low-flow conditions.

— The TMDL does not demonstrate that the great cost of a Butler WWTF upgrade required to meet the TMDL wasteload allocations would result in any DO increase in Mound Branch.

1808 I-70 Dr. SW
Columbia, MO 65203
Phone: 573-445-3279
Fax: 573-445-0680
www.mpua.org

— The Butler WWTP currently must meet stringent "10/15" mg/L 5-day biochemical oxygen demand (BOD_5) water quality-based effluent limits.

— The wasteload allocations proposed in the TMDL are unprecedented and likely cannot be consistently achieved with any technology currently used to treat domestic wastewater.

— Wasteload allocations for nutrients are not supported by water quality criteria approved by the Missouri Clean Water Commission.

— The QUAL2K model used to develop the wasteload allocations appears to be un-verified and there are other aspects of the model (such as sediment oxygen demand processes) that should be reevaluated.

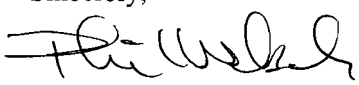
— The need for alternative dissolved oxygen criteria and/or designated uses is apparent.

We are greatly concerned that the draft TMDL places an immense burden on the City of Butler that:

— is not supported by water quality data,
— is not achievable and
— is unprecedented in Missouri.

MPUA strongly requests that the implementation plan within the TMDL includes an adaptive management approach and re-opener provisions so that the load and wasteload allocations are reevaluated within the near-term. Given the complexity of this issue and potential ramifications, MPUA and the City of Butler would appreciate the opportunity to discuss this matter directly with the Department. As always, the Missouri Public Utility Alliance appreciates the opportunity to express Missouri's municipal utility concerns to the Department.

Sincerely,



Philip K. Walsack

Manager of Environmental Services

cc: Mark Arbuthnot, City of Butler

Trent Diehl, City of Butler

Trent Stober, Geosyntec Consultants

STATE OF MISSOURI
Jeremiah W. (Jay) Nixon, Governor • Mark N. Templeton, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.mo.gov

March 9, 2010

Mr. Philip Walsack
Manager of Environmental Services
Missouri Public Utility Alliance
1808 1-70 Drive SW
Columbia, MO 65203

RE: Response to Comments on the Mound Branch Total Maximum Daily Load

Dear Mr. Walsack:

The Missouri Department of Natural Resources (Department) appreciates the comments provided by the Missouri Public Utility Alliance (MPUA) on the draft Mound Branch Total Maximum Daily Load (TMDL). This letter responds to comments (some paraphrased here in the interest of brevity) received from MPUA in a November 23, 2009 letter during the public notice period for this TMDL. Please find herein the Department's response to each comment and the location of the revision (if applicable) within the final document as it will be submitted to the U.S. Environmental Protection Agency (EPA).

Comment #1 – *The water quality data collected through the TMDL process indicates that the Butler WWTF is not the cause of low DO in Mound Branch.*

The Department acknowledges the City of Butler's WWTF is not the sole source of the dissolved oxygen (DO) impairment in Mound Branch. The TMDL document reflects this fact by allocating wasteload allocations (WLAs) for oxygen demanding substances to point sources and load allocations (LAs) of oxygen demanding substances to non-point sources. Because the source inventory assessment of the Mound Branch watershed identified the City of Butler's WWTF as a source of oxygen demanding substances, WLAs for carbonaceous biochemical oxygen demand (CBOD) and nutrients are required for the facility.

Comment #2 – *DO measurements in Mound Branch upstream of the Butler WWTF were either as low as or at times lower than DO measurements downstream from the Butler WWTF discharge.*

The Department concurs water quality data for Mound Branch above the City of Butler's WWTF exhibit DO concentrations below the minimum criterion of 5 mg/L. In reviewing the available historical water quality data, the Department found seven water quality samples above the City of Butler's WWTF with DO concentrations below the minimum criterion. However, as stated in response to Comment #1, the Department recognizes that both point and non-point sources are causing or contributing to the DO impairment. Therefore, the Mound Branch TMDL establishes WLAs and LAs, respectively, to address these sources of oxygen demanding substances.

Recycled Paper

Comment #3 – *DO in streams such as Mound Branch is naturally below the 5.0 mg/L DO criteria in summer, low-flow conditions.*

The Department acknowledges that some streams in the Osage Plains ecoregion, including reference streams such as Little Drywood Creek, can at times exhibit DO concentrations below the 5 mg/L minimum criterion. However, modeled DO and nutrient relationships for streams not impacted by anthropogenic sources of oxygen demanding substances were not available to determine the extent to which Mound Branch is affected by natural DO conditions. Until such time as these data and information are available, the Mound Branch TMDL must target the 5 mg/L DO minimum criterion found in rule.

Comment #4 – *The TMDL does not demonstrate that the great cost of a Butler WWTF upgrade required to meet the TMDL wasteload allocations would result in any DO increase in Mound Branch.*

The Department is required to develop WLAs that are protective of water quality without regard to cost or available treatment technology. The draft TMDL and supporting QUAL2K and load duration curve models demonstrate that reductions in CBOD, nutrients (total nitrogen and total phosphorous), and total suspended solids (TSS) will result in attainment of applicable water quality standards (WQS), including DO. WLAs set at levels that will attain WQS must be included in the TMDL and allocated to point sources within the watershed.

Comment #5 – *The Butler WWTP currently must meet stringent "10/15" mg/L 5-day biochemical oxygen demand (BOD_5) water quality-based effluent limits.*

The Missouri State Operating Permit (MSOP) issued on September 3, 2004 for the City of Butler's WWTF contained effluent limits for BOD_5 and TSS that were derived using previous stream surveys and QUAL2E modeling results. The more recent MSOP issued on February 11, 2010 retained existing effluent limitations (i.e. "10/15") for these parameters. Additional water quality data for nutrients and updated QUAL2K modeling required for the Mound Branch TMDL have resulted in more stringent WLAs for CBOD, TSS, and nutrients. To ensure WQS are attained in Mound Branch, these WLAs must be implemented through the City of Butler's WWTF MSOP.

Comment #6 – *The wasteload allocations proposed in the TMDL are unprecedented and likely cannot be consistently achieved with any technology currently used to treat domestic wastewater.*

As stated in response to Comment #4, the Department is required to develop WLAs that are protective of water quality without regard to cost or available treatment technology. Should WLAs result in effluent limitations that are beyond the limits of current treatment technology, the Department may develop a phased approach to TMDL implementation of effluent limitations through the use of the best available treatment technology. This approach can be implemented either within the MSOP or through a settlement agreement. As discussed in a December 9, 2010 meeting with the City of Butler, Geosyntec, and the Department, Section 12 (Implementation Plans) of the TMDL document has been revised to include a phased approach to TMDL WLA implementation in the City of Butler's WWTF MSOP.

Comment #7 – *Wasteload allocations for nutrients are not supported by water quality criteria approved by the Missouri Clean Water Commission.*

It is recognized by EPA in their National Nutrient Strategy[1], and widely understood in general, that excessive nutrients in a water body can lead to potentially harmful algal blooms which can in turn contribute to low DO conditions. The TMDL sets targets to reduce nutrient concentrations to a level that will decrease algal productivity, thereby reducing the algal biomass available for decay and decomposition. The reduction of available algae will lead to a reduction in oxygen demanding substances in the water column (CBOD) and on the stream bottom as sediment oxygen demand (SOD).

It is within the authority of the Department to set WLAs for pollutants that cause or contribute to the impairment of a water body. According to 40 CFR 122.44(d)(l)(i), "Limitations must control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard, including state narrative criteria for water quality." Furthermore, this TMDL was developed to comply with Sections 303(d) and 302(a) of the Clean Water Act which dictates that when technology-based effluent limitations result in impaired water quality and non-attainment of designated uses, water quality-based effluent limitations shall be established. Domestic wastewater treatment facility effluent contains nutrient concentrations at levels that can cause or contribute to algal growth, respiration, and decomposition in the receiving stream. These conditions in turn can cause or contribute to violations of the state minimum water quality criterion for DO.

The QUAL2K model used for the Mound Branch TMDL recognizes that total nitrogen and total phosphorus can cause or contribute to low DO issues in the stream through algal growth, respiration, and decomposition. Because total nitrogen and total phosphorous are addressed in the model, WLAs are required for the City of Butler's WWTF. Development of TMDL WLAs using the QUAL2K model ensure attainment and compliance with applicable WQS as required by federal regulation at 40 CFR 130.7(c).

Comment #8 – *The QUAL2K model used to develop the wasteload allocations appears to be unverified and there are other aspects of the model (such as sediment oxygen demand processes) that should be reevaluated.*

The QUAL2K model for 2003 was not validated with the 2004 data because the 2004 sampling was not representative of the critical condition. For the purposes of the TMDL, the model was used to establish WLAs protective of water quality under critical low-flow conditions. The model is not designed to be used to describe the dynamics of the system under varying flow and climatic conditions; hence, validation under a different condition is not necessary. A comparison of conditions during the two studies is shown below:

---

[1] National Strategy for the Development of Regional Nutrient Criteria (June 1998). EPA 822-R-98-002.

	August 2003	August 2004
Average Water Temperatures		
MB1	25.0	20.3
MB2	25.0	22.6
MB3	24.4	21.1
Flow at MB1 (1.2 mi U/S of WWTP)	0.06 cfs	0.42 cfs
Air Temperature (Butler4W)		
Minimum	62 (8/4) 64 (8/5)	54 (8/16) 56 (8/17)
Maximum	97 (8/4) 99 (8/5)	80 (8/16) 92 (8/17)
Average	79 (8/4) 81 (8/5)	67 (8/16) 75 (8/17)
Antecedent Rainfall (30 days)	1.61 in. (7/4 – 8/4)	4.92 in. (7/15-8/15)

Regarding SOD processes, the model allocation run discounts the effects of SOD and a minimal SOD flux was prescribed. However, if the WLA results are desired to be more conservative, additional mechanistic modeling of SOD processes would likely result in more stringent CBOD limits, lower than what is indicated in the TMDL. Recalibration of the QUAL2K model is not necessary and would not change the results of the analysis. Additionally, a 30-40 percent SOD bottom coverage is a less conservative assumption and a more conservative estimate would likely result in more stringent CBOD WLAs for the City of Butler's WWTF.

Comment #9 – *The need for alternative dissolved oxygen criteria and/or designated uses is apparent.*

The final TMDL has been revised to include amended implementation language acknowledging that low DO is an issue in Mound Branch both upstream and downstream of the WWTF. The new language also acknowledges issues regarding low DO as a natural background condition in prairie streams in this ecological region. The Department may develop revised DO criteria for Mound Branch and similar streams during future triennial reviews of the WQS if resources are available. Additional monitoring and analysis will determine whether the DO minimum criterion of 5 mg/L is appropriate, or if a new site-specific DO criterion is required. The Department acknowledges that should revised criteria be developed, a revised Mound Branch TMDL may be necessary. It also acknowledges; however, that the revised criteria may result in no impact for Mound Branch and that new loading calculations may not differ or offer relief from what is currently contained in this TMDL.

Comment #10 – *We are greatly concerned that the draft TMDL places an immense burden on the City of Butler that is not supported by water quality data, is not achievable and is unprecedented in Missouri.*

The Department appreciates the comments and concerns of MPUA. As found in the Mound Branch TMDL and in the responses to comments above, the draft TMDL demonstrates that pollutant reductions of CBOD, TSS, and nutrients are required to ensure attainment of applicable WQS. The Department recognizes; however, and agrees with MPUA that a phased implementation (adaptive management) approach is the most practical path forward for the City of Butler and other stakeholders within the watershed. To this end, Section 12 (Implementation

Plans) of the TMDL document has been revised to reflect the phased implementation of WLAs within the City of Butler's WWTF MSOP.

The Department understands that resources are limited and that communities are sometimes hard pressed to meet the demands of water and wastewater system improvements. I invite you to refer the city to the Department's Financial Assistance Center to discuss grant and low-interest loan options that may be available to the city should wastewater system improvements be necessary. To reach the Financial Assistance Center, please call (573) 751-1192 and ask for either Mr. Doug Garrett or Ms. Traci Newberry. Mr. Garrett can also be reached by e-mail at doug.garrett@dnr.mo.gov. You can also find the Department's Financial Assistance Center on the web at http://www.dnr.mo.gov/env/wpp/srf/index.html.

Thank you again for your comments. The Department is committed to working with the City of Butler toward implementing this TMDL once it is approved by EPA. If you should have questions or would like to discuss this TMDL further, please contact me at (573) 526-1446, john.hoke@dnr.mo.gov or by mail at the Missouri Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, Missouri 65102.

Sincerely,

WATER PROTECTION PROGRAM

John Hoke, Chief
TMDL Unit

JH:apl

MDC comments on Mound Branch TMDL

Mike McKee to: 'john.hoke@dnr.mo.gov' 12/14/2009 04:58 PM
Cc: "Tom Priesendorf", "Mike Smith"

John,

Thanks for soliciting comments on the Mound Branch TMDL. The modeling and assessment seems adequate. The implementation plan is well developed for the Non-Point Source plan. However, the Point Source plan was less clear.

Specific comments on section 12.1 (Point Source plan):

1. If the current permit expires September 2, 2009, is it reasonable to delay new permit requirements until the conclusion of the Triennial Review in 2012? Are you assuming that the current 10 mg/L BOD limit will be compliant with the needs of this TMDL? If so, I would suggest adding text justifying this.
2. Related to the above comment, what will happen if the new DO criteria are not promulgated in 2012. Would the TMDL implementation then be based on current DO criteria?

Thanks for the opportunity to comment.

Mike McKee
Resource Scientist
Missouri Department of Conservation
1110 S. College Avenue
Columbia, MO 65201

573-882-9909 ext 3255

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
Jeremiah W. (Jay) Nixon, Governor • Mark N. Templeton, Director
www.dnr.mo.gov

March 10, 2010

Mr. Mike McKee
Missouri Department of Conservation
1110 South College Avenue
Columbia, MO 65201

RE: Response to Comments on the Mound Branch Total Maximum Daily Load

Dear Mr. McKee:

The Missouri Department of Natural Resources (Department) appreciates the comments provided by the Missouri Department of Conservation (MDC) on the draft Mound Branch Total Maximum Daily Load (TMDL). This letter responds to a comment e-mail from MDC dated December 14, 2009. Please find herein the Department's response to each comment and the location of the revision (if applicable) within the final document as it will be submitted to the U.S. Environmental Protection Agency (EPA).

Comment #1: *If the current permit expires September 2, 2009, is it reasonable to delay new permit requirements until the conclusion of the Triennial Review in 2012? Are you assuming that the current 10 mg/L BOD limit will be compliant with the needs of this TMDL? If so, I would suggest adding text justifying this.*

The City of Butler's Wastewater Treatment Facility (WWTF) Missouri State Operating Permit (MSOP) was renewed on February 11, 2010. The renewed MSOP contained effluent limitations for biochemical oxygen demand (BOD) and total suspended solids (TSS) that were retained from the previous version of the MSOP. These effluent limitations (i.e., "10 mg/L BOD") were derived using previous stream surveys and QUAL2E modeling results.

Additional water quality data for nutrients and updated QUAL2K modeling required for the Mound Branch TMDL have resulted in more stringent wasteload allocations (WLAs) for carbonaceous biochemical oxygen demand (CBOD), TSS, and nutrients. To ensure water quality standards (WQS) are attained in Mound Branch, these WLAs must be implemented through the City of Butler's WWTF MSOP. The timing for inclusion of TMDL WLAs in the MSOP will depend on the results of additional water quality monitoring that remains to be conducted.

Recycled Paper

The final TMDL has been revised to include amended implementation language that acknowledges low dissolved oxygen (DO) as an issue in Mound Branch both upstream and downstream of the WWTF. The new language also acknowledges issues regarding low DO as a natural background condition in prairie streams in this ecological region. The Department may develop revised DO criteria for Mound Branch and similar streams during future triennial reviews of the WQS if resources are available. Additional monitoring and analysis will determine whether the DO minimum criterion of 5 mg/L is appropriate, or if a new site specific DO criterion is required.

The Department acknowledges that should revised criteria be developed, a revised Mound Branch TMDL may be necessary. It also acknowledges; however, that the revised criteria may result in no impact for Mound Branch and that new loading calculations may not differ or offer relief from what is currently contained in this TMDL. If water quality monitoring indicates the existing 5 mg/L minimum DO criterion is appropriate, TMDL WLAs will be implemented into the MSOP using a phased approach.

Comment #2: *Related to the above comment, what will happen if the new DO criteria are not promulgated in 2012. Would the TMDL implementation then be based on current DO criteria?*

As stated in response to Comment #1, if water quality monitoring and analysis indicate that revised DO criteria are not appropriate for Mound Branch, or if revised DO criteria are not developed, TMDL WLAs for CBOD, TSS, and nutrients will be implemented into the MSOP using a phased approach. The revisions made to Section 12.1 (Implementation Plans, Point Sources) should reflect this approach.

Thank you again for your comments and support of the TMDL process. If you have questions or would like to discuss this TMDL further, please contact me at (573) 526-1446, at john.hoke@dnr.mo.gov, or by mail at the Missouri Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, Missouri 65102.

Sincerely,

WATER PROTECTION PROGRAM

John Hoke, Chief
TMDL Unit

JH:apl

Mound Branch TMDL

Brad Powell to: john.hoke 12/11/2009 01:52 PM
Cc: tucker.fredrickson, joyce.rider

Dear Mr. Hoke,

Please find attached to this message a letter with our comments concerning the Mound Branch TMDL in Bates County Mo. This letter was compiled from information that was gathered at our Monthly Board meeting on December 10, 2009. We will follow up this e-message with a signed hard copy.

The Bates County Soil and Water Conservation District can be reached at:

Bates Co. SWCD
625 W. Nursery
Butler, MO 64730

Phone number: 660-679-6124, ext 3 / ask for Brad

We Thank you in Advance for your review of our comments.
Sincerely,
Brad Powell

TMDL letter of concerns - 12-10-09.doc

Bates County Soil and Water Conservation District

625 W. Nursery, Box B
Butler, MO 64730
660-679-6124

Board of Supervisors:
Darrell Stevener, Chairman
Rod Morris, Vice-Chairman
Al Decker, Secretary
Doug Cox, Treasurer
Mark Nelson, Member

Bates Co. SWCD Staff:
Joyce Rider-Diehl, District Manager
Elizabeth Davis, District Clerk
Brad Powell, SALT Manager/Technician
Rusty Roach, Technician

USDA, NRCS Staff:
David Clyman, District Conservationist
V. Cecile "Sam" Allen, Resource Conservationist
Alan Hayes, Resource Conservationist
Dean Borland, Soil Conservation Technician
Chuck Lewis, Soil Conservation Technician

RECEIVED
2009 DEC 21 PM 12:29
WATER PROTECTION PROGRAM

December 11, 2009

Department of Natural Resources
Water Protection Program
Water Quality Monitoring and Assessment Section
Attn.: Mr. John Hoke
P.O. Box 176
Jefferson City, MO 65102-0176

Dear Mr. Hoke,

The Bates County Soil and Water Conservation District respectfully wishes to extend our comments to the Department of Natural Resources Water Protection Program's Water Quality Monitoring and Assessment Section concerning the Draft TMDL for the Mound Branch of Bates County Missouri. We will address our concerns in the same chronological order as the draft TMDL for Mound Branch has been presented.

The Setting/Appearance:

When walking upon the Mound Branch for the first time you do not get the impression that this is a stream you would want to float, swim or maybe even fish. The topography, land use/management and climatic features simply do not allow for the Mound Branch to be the inviting, come to the country, relax and have fun kind of stream you see on some TV commercials. The Mound Branch is located in a Prairie region with transitions to the Ozarks. "Prairie" streams act and react differently than the "pristine" spring fed streams of the Ozarks. We consider the primary function of the Mound Branch as being a source of water for livestock and wildlife and while high quality is relevant to their well being as well, it is not to the same level as for humans. Hence, it is our belief that there should be separate criteria for these types of streams as is even indicated throughout this TMDL document. It is also our belief that these criteria should be fully developed, tested and reviewed before placing a stream such as the Mound Branch on the 303d list.

Defining the Problem:

As previously mentioned above and referencing paragraph 2.4 of this document, there is some question as to the minimum levels of DO required for certain aquatic organisms living within these waters, hence it appears to us that the problem has not been fully defined and without new parameters/minimum levels being established, how do we go about treating the watershed correctly? Being a good Steward of our Natural Resources means many things, one of which is proper utilization of funds to treat Water Quality concerns.

We are concerned about the Modeling and the lack of "quality" monitoring that was done in association with the development of this document. It seems to us that there were some broad assumptions and comparisons used in the development of this model, referencing: par. 8.2.2 Nutrients, "sites in the vicinity of the impaired stream"; par. 3.2.1 Runoff from Agricultural Areas, "footnote 3" – explanation of cattle density. The underlying philosophy of "Watershed Management" is to identify and address the concerns of that watershed and not the concerns of an entire state; reference par. 3.2.3 Onsite Wastewater Treatment Systems. It also appears that the model did not use the most recent data available; reference Appendix B, par. I. Modeling Approach. While we believe that Modeling is a useful tool in Watershed Planning it should not be the Primary Instrument in placing a water body on a list of impaired waters.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation and marital or family status. (Not all prohibited bases apply to all programs) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audio-tape, etc.) should contact USDA's TARGET Center at (202)720-2600 (voice & TDD). To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call (202)720-5946 (voice or TDD).
Bates County SWCD is an Equal Opportunity Provider and employer.

Conclusion:

It is in our opinion that this document was prepared too hastily and while some of the tools utilized in making this document have merit, they should have been used as tools to trigger more in depth and conclusive monitoring/sampling data. Additionally, we feel the monitoring/sampling could have been done cooperatively with Agency people and Local residents/stakeholders side by side utilizing agency expertise with valuable local input. It is hard to beat that kind of cooperation. As shown in par. 12.2 Nonpoint Sources, an eagerness to cooperate and implement action on a Public concern is available as long as that Public concern is based on sound and qualified data.

It is also our opinion that not all streams are created equally and should not be judged accordingly. We want to thank you in advance for your review of our comments/concerns.

Sincerely,

Bates County Soil and Water
Conservation District

STATE OF MISSOURI
Jeremiah W. (Jay) Nixon, Governor • Mark N. Templeton, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.mo.gov

March 10, 2010

Mr. Darrell Stevener, Chairman
Bates County Soil and Water Conservation District
625 West Nursery, Box B
Butler, MO 64730

RE: Response to Comments on the Mound Branch Total Maximum Daily Load

Dear Mr. Stevener:

The Missouri Department of Natural Resources (Department) appreciates the comments provided by the Bates County Soil and Water Conservation District (Bates County SWCD) on the draft Mound Branch Total Maximum Daily Load (TMDL). This letter responds to comments (some paraphrased here in the interest of brevity) received from the Bates County SWCD in a December 11, 2009 letter during the public notice period for this TMDL. Please find herein the Department's response to each comment and the location of the revision (if applicable) within the final document as it will be submitted to the U.S. Environmental Protection Agency (EPA).

Comment #1 – *The Setting/Appearance: We consider the primary function of the Mound Branch as being a source of water for livestock and wildlife and while high quality is relevant to their well being as well, it is not to the same level as for humans. Hence, it is our belief that there should be separate criteria for these types of streams as is even indicated throughout this TMDL document. It is also our belief that these criteria should be fully developed, tested and reviewed before placing a stream such as the Mound Branch on the 303d list.*

All classified waters of the state are identified in state rule by how the water body is used. These uses are called designated (or beneficial) uses and water quality criteria are associated with each use to ensure the water body can be safely used as intended. Designated uses found in state rule that are assigned to Mound Branch include: Protection of Warm Water Aquatic Life, Protection of Human Health (Fish Consumption), Livestock and Wildlife Watering, and Whole Body Contact Recreation, or swimming, use. Water quality assessments indicate the Protection of Warm Water Aquatic Life designated use is impaired and that Mound Branch does not attain the dissolved oxygen (DO) minimum criterion found in rule. The 5 mg/L DO minimum criterion applies to all waters of the state identified as general warm water fisheries, including Mound Branch, regardless of geographic location.

The Department does not have data or information to indicate the Livestock and Wildlife Watering designated use for Mound Branch is impaired. The Department does; however, have data of sufficient quality and quantity to determine Mound Branch is impaired for the Protection of Warm Water Aquatic Life designated use. The TMDL for Mound Branch has been developed to provide the pollutant load reductions necessary to ensure attainment of all applicable water quality standards (WQS), including DO.

Comment #2 – *Defining the Problem: Referencing paragraph 2.4 of this document, there is some question as to the minimum levels of DO required for certain aquatic organisms living within these waters, hence it appears to us that the problem has not been fully defined and without new parameters/minimum levels being established, how do we go about treating the watershed correctly?*

TMDL modeling and analysis must target and reflect WQS and associated water quality criteria found in state rule. For the Protection of Warm Water Aquatic Life use in Mound Branch, the DO minimum criterion of 5 mg/L must be achieved at all times. The Mound Branch TMDL modeling and analysis target the 5 mg/L minimum DO criterion and pollutant load reductions are calculated to ensure applicable WQS are achieved.

The Department acknowledges that some streams in the Osage Plains ecoregion, including reference streams such as Little Drywood Creek, can at times exhibit DO concentrations below the 5 mg/L minimum criterion. However, modeled DO and nutrient relationships for streams not impacted by anthropogenic sources of oxygen demanding substances were not available to determine the extent to which Mound Branch is affected by natural DO conditions. Until such time as these data and information are available, the Mound Branch TMDL must target the 5 mg/L DO minimum criterion found in rule.

The final Mound Branch TMDL has been revised to include amended implementation language acknowledging that low DO is an issue in Mound Branch both upstream and downstream of the City of Butler's Wastewater Treatment Facility (WWTF). The new language also acknowledges issues regarding low DO as a natural background condition in prairie streams in this ecological region. The Department may develop revised DO criteria for Mound Branch and similar streams during future triennial reviews of the WQS if resources are available. Additional monitoring and analysis will determine whether the DO minimum criterion of 5 mg/L is appropriate, or if a new site-specific DO criterion is required. The Department acknowledges that should revised criteria be developed, a revised Mound Branch TMDL may be necessary. It also acknowledges; however, that the revised criteria may result in no impact for Mound Branch and that new loading calculations may not differ or offer relief from what is currently contained in this TMDL.

Comment #3 – *Defining the Problem: We are concerned about the Modeling and the lack of "quality" monitoring that was done in association with the development of this document.*

The water quality data and information used to list Mound Branch as impaired for low DO met or exceeded data quality and quantity objectives outlined in the Department's 303(d) listing methodology process. Likewise, the Department believes the water quality data and information collected for the Mound Branch TMDL are of sufficient quality and quantity to develop appropriate wasteload allocations (WLAs). Stream sampling and survey guidance documents used by the Department resulted in representative data being collected for TMDL WLA development. Wasteload and load allocation modeling was conducted using EPA approved models and methods (QUAL2K and load duration curves, respectively) and conservative assumptions were used where appropriate to reduce uncertainty. Therefore, the Department believes the TMDL development process for Mound Branch was conducted properly.

Comment #4 – *Defining the Problem: It seems to us that there were some broad assumptions and comparisons used in the development of this model, referencing: par. 8.2.2 Nutrients, "sites in the vicinity of the impaired stream"; par. 3.2.1 Runoff from Agricultural Areas, "footnote 3" - explanation of cattle density. The underlying philosophy of "Watershed Management" is to identify and address the concerns of that watershed and not the concerns of an entire state; reference par. 3.2.3 Onsite Wastewater Treatment Systems.*

The Department agrees that, when available, water quality data specific to the impaired watershed is preferred to statewide averages. However, in most cases the data needed to develop a comprehensive water quality model are not of sufficient quality or quantity for TMDL development. In these cases, statewide averages are used to determine a reasonable estimate of the values likely to be found in the impaired watershed. To account for any uncertainty that arises from estimated values, conservative assumptions are made in the modeling process. These conservative assumptions can serve as an implicit margin of safety, which is a required element of the TMDL process per 40 CFR 130.7(c)(1).

In addition, post-TMDL water quality monitoring is an integral part of ensuring the targets and goals set by a TMDL are achieved. As part of the implementation of the Mound Branch TMDL, it is recommended that additional sampling that includes biological sampling occur in the affected segment of Mound Branch prior to implementation of the WLAs to assess the water body's attainment with designated beneficial uses. The project that the Osage Valley Resource Conservation & Development Council has undertaken (i.e., the comprehensive evaluation of point and nonpoint source loads to Mound Branch) is an important part of this process.

Comment #5 – *Defining the Problem: It also appears that the model did not use the most recent data available; reference Appendix B, par. I. Modeling Approach. While we believe that Modeling is a useful tool in Watershed Planning it should not be the Primary Instrument in placing a water body on a list of impaired waters.*

As stated in Appendix B, 1. Modeling Approach, the "most recent" data obtained in 2008 were not used because of the poor quality of stream section/flow and continuous DO measurements, the timing of stream section and chemistry samples, and because the sampling was not representative of critical condition. For these reasons, the 2008 water quality data were not used for TMDL model development and calibration.

Please note that the TMDL water quality modeling was not the primary instrument in placing Mound Branch on the 303(d) List of impaired waters. Water quality data and methods for assessing water quality impairments were used to list Mound Branch as impaired. The Mound Branch TMDL water quality modeling was conducted to determine the amount of pollutant reduction necessary for Mound Branch to attain applicable WQS.

Comment #6 – *Conclusion: It is in our opinion that this document was prepared too hastily and while some of the tools utilized in making this document have merit, they should have been used as tools to trigger more in depth and conclusive monitoring/sampling data. Additionally, we feel the monitoring/sampling could have been done cooperatively with Agency people and Local residents/stakeholders side by side utilizing agency expertise with valuable local input. It is hard to beat that kind of cooperation. As shown in par. 12.2 Nonpoint Sources, an eagerness to cooperate and implement action on a Public concern is available as long as that Public concern is based on sound and qualified data.*

The Department believes that data of sufficient quality and quantity exist from which to develop a TMDL to address the low DO impairment in Mound Branch. EPA approved models and approaches have been used to determine pollutant reductions necessary to ensure attainment of all applicable WQS in the water body. Also, Mound Branch is a TMDL Consent Decree water that must have a TMDL established and approved by December 31, 2010. For these reasons, additional monitoring, modeling, and analysis are not necessary to complete the Mound Branch TMDL.

The Department agrees that cooperative monitoring approaches are extremely beneficial and engage watershed stakeholders in the TMDL process. The Osage Valley Resource Conservation & Development Council project will contribute valuable data from which to assess water quality improvements within the Mound Branch watershed. The Department appreciates the interest and involvement of the Osage Valley Resource Conservation & Development Council and its members.

Thank you again for your comments and support of the TMDL process. If you have questions or would like to discuss this TMDL further, please contact me at (573) 526-1446 or by mail at the Missouri Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, Missouri 65102.

Sincerely,

WATER PROTECTION PROGRAM

John Hoke, Chief
TMDL Unit

JH:apl

December 11, 2009

John Hoke, Environmental Specialist, TMDL Unit Chief
Mo Department of Natural Resources Water Pollution Program
Water Quality Monitoring and Assessment Section
Lewis and Clark State Office Building
1101 Riverside Drive, P.O Box 176
Jefferson City, MO 65102-0176

RE: Draft Mound Branch Total Maximum Daily Load or TMDL, Bates County, Missouri Comments

Dear Mr. Hoke:

The Citizens Watershed Committee (CWC) for the Marais des Cygnes, Marmaton, and Little Osage River Watersheds are respectfully requesting your agencies reconsideration of this organization's concerns and issues in regards to the "**Draft Total Maximum Daily Load (TMDL) for Mound Branch**", hydrologic unit code 10290102-120005, water body identification # 1300, Bates County, Missouri released for public comment October 29, 2009.

First, as an all volunteer committee from Bates and Vernon Counties comprised of numerous volunteer organizations requiring member consensus on issues of such importance as this report we recommend that the window of opportunity for public comment be a minimum of 45-60 days to allow for maximum participation. Also the author(s) of this and other draft reports need to be placed prominently on the title page of the document so that the public with follow-up questions can request such questions before commenting and drawing invalid conclusions. The name and contact phone or email address should be prominently displayed whether it is an agency staff person or a contractor. All other grants thru EPA or Missouri Department of Natural Resources-Water Quality Monitoring and Assessment Section (MoDNR) are so stipulated with those grants consequently Missouri Department of Natural Resources-Water Quality Monitoring and Assessment Section as a grant recipient should too.

Listed below are the Draft TMDL content the following issues or concerns were expressed by the CWCs partner membership

1 ➢ The City of Butler has expressed major concern about the future impact on its waste water treatment plant upgrades that will be necessitated should point and non-point sources are not abated to the levels this report dictates. The city is well aware that disinfection was coming but did not anticipate this potential level of scrutiny. Would this be another unfunded mandate on communities struggling economically?

2 ➢ The City is concerned about the expense of installing the required waste water treatment system equipment that will meet current requirements but may not meet future requirements. The city currently is being offered a temporary operating permit good only through 2012 with no guarantee of future regulatory requirements. It is their belief that this permit is being offered as a guarded measure by MoDNR-WPP rather than issuing the standard 5-year permit.

3 ➢ The CWC with and through the Osage Valley Resource Conservation and Development Council (OVRCD) has begun the slow process of securing funding for restoration of this watershed as identified in ***the "The Marais des Cygnes, Marmaton, and Little Osage River Watershed Management Action Plan-2006"*** . The ***"Mound Branch Watershed Evaluation and Restoration Project-Bates County, Missouri, Section 319 Sub-grant G09-NPS04"*** is in its beginning phases. While funding has been secured (release of funds pending) for the installation water quality practices, education, and water quality monitoring as major components, it seems odd to use data from several years ago when new data will be available very soon. The project lifespan is 4-years and will not get its first practices installed until the summer or late fall of 2010. It is well known by water quality experts that there is a major lag period between when a practice is installed and documenting water quality benefits. For most non-point water quality benefits it ranges from 10-15 years. Monitoring data under this project will be available within 3-6 months and will continue for remainder of this 4 year project.

RE: Draft Mound Branch Total Maximum Daily Load or TMDL, Bates County, Missouri Comments (Cont'd)

4 ➢ MoDNR has offered in the draft TMDL report to pursue a new standard for dissolved oxygen (DO) levels before the TMDL is finalized or at least by 2012. However the watershed community / CWC have so far not been asked to participate. It appears the regulators are not ready to pursue a revised standard at this time based on conversations over the past few years. The CWC is ready and willing to assist in this endeavor.

5 ➢ The proposal indicates a 3-year window to improve DO levels but properly installed water quality benefiting practices will not begin to show improved results until approximately 10-15 years following installation.

6 ➢ The citied impairment in the Draft TMDL lists aquatic life for the Mound Branch, but the documents appear to vary from documentation regarding that impairment. The water quality evidence utilized in this draft TMDL assumes the impaired water use but has not been documented with the level of habitat loss. The first evidence that the local watershed residents knew of perceived water quality impairment was when MoDNR-WPP and the Kansas City Regional Office staff met with the CWC to discuss options. The CWC took action as directed by MoDNR partners to rectify the issues and concerns, thus the pending watershed restoration project.

7 ➢ There are several questions regarding the livestock data and the validity of the number of livestock in the watershed nutrient contribution assumptions used. We believe the data is old and not representative of this watershed versus the balance of Bates County. Additionally some questions exist regarding the number of wetland acres, row-crop acreage along stream banks, etc. The authors have on occasions in the document checked with sources outside the agency to document facts and conditions (anecdotal); yet when it comes to the small area involved in this impaired water body they fail to utilize local resource staff for a more accurate depiction of the watershed involved. Agencies, such as University of Missouri-Extension, Bates County SWCD, and USDA- NRCS, to name a few, would have far more up-to-date data. This would make it more believable to the local watershed residents and decision makers because many of their local programs are directed by this information detailed.

8 ➢ The draft TMDL report makes assumptions about pollutants to the impaired stream without documented evidence. It assumes issues with the city yard-waste collection site but in the next breath discounts any potential from 3 commercial sites within the watershed with just as much potential. The tannin runoff from a commercial operation may be as great or greater concern. The same is true from commercial fertilizer mixing and distribution plants for the county. These places have storm water permits yet there is no evidence of these being inspected for accidental spills that may take weeks or months lag time for delivery to a branch stream in the watershed. The locations of these establishments in the Mound Branch watershed while not conclusively contributors, they should not be overlooked within the draft TMDL report regardless of the fact that they have only a stormwater permit. A shovel full of granular fertilizer can send pounds of nutrients to a stream. At the same time, the City of Butler's yard waste site should not be the exclusive contributor. Where is the data?

9 ➢ What are the assumptions used for the waste load model, **QUAL2K Model** and sub-routines within this and other models? The model(s) and sub-routines may not be well known and commonly accepted. These model sources need to be made known to the public in this document and in what version. An assumption by somebody far away from the source of the watershed is not accurate. A committee comprised of local watershed residents and users would add credibility to the process early in the development of a TMDL.

RE: Draft Mound Branch Total Maximum Daily Load or TMDL, Bates County, Missouri Comments (Cont'd)

- The "Reference Streams", Ecological Drainage Units (EDUs), cited in the draft TMDL report to compare Mound Branch stream network is flawed; The similarity is not there in land form, land uses, watershed characteristics, etc. It would appear that the author(s) are attempting to draw conclusions from other sources that are not even representative of Mound Branch Watershed characteristics. We urge the author(s) to visit website: ***"Biological Criteria for Wadeable/Perennial Streams of Missouri"***, Feb. 2002; Randy Sarver and Stuart Harlan MoDNR-ALPD, Environmental Services Program; http://www.dnr.mo.gov/env/esp/docs/BiologicalCriteriaforWadeableStreamsofMissouri.pdf and the reports from 2001 and 2007 sponsored by MoDNR on this very topic. Incidentally the reports have not changed during these two periods. ***"Ozark Stream Class Ecological Archives M077-010-A2"***; Scott P. Sowa, Gust Annis, Michael E. Morey, and David D. Diamond. 2007. A Gap analysis and comprehensive conservation strategy for riverine ecosystems of Missouri. ***Ecological Monographs 77:301–334; Appendix B. Map showing the 17 Ecological Drainage Units (EDUs) of Missouri***; http://esapubs.org/Archive/mono/M077/010/appendix-B.htm . MoDNRs own documentation reports, the only reference stream for Mound Branch watershed as **"Little Drywood Creek, Vernon County, Missouri"**. This draft TMDL did not use any of this streams data to support its claims for restoration. Why?

Referenced streams listed in the document:

- South Grand River [Archie, MO and Freeman, MO] (Cass County) is a severely channelized muddy bottomed channel with row-crop up to its bank edges and a major flood plain diked;
- Muddy Creek Branches (Cass County) has major urbanization with at least 2 large impoundments across the stream in several locations;
- Big Creek (Cass, Johnson and Henry Counties) again is not typical of this watershed. It is channelized and diked for waterfowl hunting clubs;
- W. Tebo Creek (Henry County) is an abandoned strip mined watershed;
- Cedar Creek (Pleasant View,MO); Ozark Stream Class;
- Weaubleau Creek, (St. Clair County); Ozark Stream Class:
- Brushy Creek (St. Clair County)

Thanks you for allowing us to provide input in the draft Mound Branch TMDL. Also we want to thank you for extending the public review and comment period. If you have any questions about the concerns expressed by the Citizens Watershed Committee please do not hesitate to contact either of us.

Sincerely,

Danny Hahn, President
Citizens Watershed Committee
[816] 297-2747

Randy W. Pike, Commissioner
Northern Bates County
[660] 679-8626

Information requested regarding Mound Branch comment letter of 12/14/09

Anne Peery to: randywpike 12/18/2009 10:20 AM
Cc: John Hoke
Bcc: All Message Store

Good morning, Mr. Pike!
I am working on responding to the comment letter you submitted via fax on Dec 14, 2009. Two of the bullets (attached below) discuss where the department could have used better, watershed specific information. Could you send us the specific information you would like to see included in the TMDL ? (We took the liberty of numbering the bullets for easier reference.)

7. *There are several questions regarding the livestock data and the validity of the number of livestock in the watershed nutrient contribution assumptions used. We believe the data is old and not representative of this watershed versus the balance of Bates County. Additionally some questions exist regarding the number of wetland acres, row-crop acreage along stream banks, etc. The authors have on occasions in the document checked with sources outside the agency to document facts and conditions (anecdotal); yet when it comes to the small area involved in this impaired water body they fail to utilize local resource staff for a more accurate depiction of the watershed involved. Agencies, such as University of Missouri-Extension, Bates County SWCD, and USDA-NRCS, to name a few, would have far more up-to-date data. This would make it more believable to the local watershed residents and decision makers because many of their local programs are directed by this information detailed.*

These are exactly the kind of comments that are so helpful to the TMDL. The contractor (Tetratech) that compiled the background information used the National Agricultural Statistics Service (NASS). These statistics are county specific. The department agrees it is certainly better to use information from local landowners specific to the Mound Branch watershed. Any information you can supply to tailor these sections to your situation could be included in the document instead of the more general figures presently used.

8. *The draft TMDL report makes assumptions about pollutants to the impaired stream without documented evidence. It assumes issues with the city yard-waste collection site but in the next breath discounts any potential from 3 commercial sites within the watershed with just as much potential. The tannin runoff from a commercial operation may be as great or greater concern. The same is true from commercial fertilizer mixing and distribution plants for the county. These places have storm water permits yet there is no evidence of these being inspected for accidental spills that may take weeks or months lag time for delivery to a branch stream in the watershed. The locations of these establishments in the Mound Branch watershed while not conclusively contributors, they should not be overlooked within the draft TMDL report regardless of the fact that they have only a stormwater permit. A shovel full of granular fertilizer can send pounds of nutrients to a stream. At the same time, the City of Butler's yard waste site should not be the exclusive contributor. Where is the data?*

Again, the general information and assumptions were used and assumed in the absence of more specific data. It should be noted that, in general, storm water permits are not considered to contribute to the impairment because low dissolved oxygen is a problem at low flow, not storm flows. Is the "city yard-waste collection" site the same as the city composting site mentioned in

Section 3.2.2? That site and the others bulleted under "other urban nonpoint sources" were noted by Jody Mayes from the department's Kansas City Regional Office on a site visit in Dec 2005. If the CWC wants to propose alternative text, please do so. Also, if the CWC knows of other potential sources of nutrients or sediment or other constituents that might contribute to low DO, feel free to send us text to use in place of or in addition to what we presently have in the document.

We would like this information by close of business next Wed , Dec 23rd. This way we can edit the TMDL, answer your letter and submit the TMDL by year's end (our schedule is related to the lawsuit we are under).
Thank you,

Anne Peery
Total Maximum Daily Load (TMDL) Developer
Missouri Department of Natural Resources
Water Protection Program
Phone: 573-526-1426
Fax: 573-522-9920

STATE OF MISSOURI
Jeremiah W. (Jay) Nixon, Governor • Mark N. Templeton, Director
DEPARTMENT OF NATURAL RESOURCES
www.dnr.mo.gov

March 12, 2010

Mr. Randy W. Pike
Northern Bates County Commissioner
Bates County Courthouse
1 North Delaware Street
Butler, MO 64730

RE: Response to Comments on the Mound Branch Total Maximum Daily Load

Dear County Commissioner Pike:

The Missouri Department of Natural Resources (Department) appreciates the comments provided by Bates County and the Citizens Watershed Committee (CWC) for the Marais des Cygnes, Marmaton and Little Osage River Watersheds on the draft Mound Branch Total Maximum Daily Load (TMDL). This letter responds to comments (some paraphrased here in the interest of brevity) received from Bates County and the CWC on December 14, 2009. Please find herein the Department's response to each comment and the location of the revision (if applicable) within the final document as it will be submitted to the U.S. Environmental Protection Agency (EPA).

We recommend that the window of opportunity for public comment be a minimum of 45-60 days to allow for maximum participation. Also the author(s) of this and other draft reports need to be placed prominently on the title page of the document so that the public with follow-up questions can request such questions before commenting and drawing invalid conclusions. The name and contact phone or email address should be prominently displayed whether it is an agency staff person or a contractor.

At the request of the CWC, the Department extended the public comment period for the Mound Branch TMDL from 30 days to 45 days. The Department has also decided that all future public notice periods shall be for 45 days. Contact information for submitting questions about a TMDL are provided in the public notice announcement that is distributed at the beginning of the public notice period.

Recycled Paper

Comment #1: *The City of Butler has expressed major concern about the future impact on its waste water treatment plant upgrades that will be necessitated should point and non-point sources are not abated to the levels this report dictates. The city is well aware that disinfection was coming but did not anticipate this potential level of scrutiny. Would this be another unfunded mandate on communities struggling economically?*

The Mound Branch TMDL has been developed to comply with Sections 303(d) and 302(a) of the federal Clean Water Act. These sections dictate that TMDLs and associated pollutant allocations must be developed for sources discharging pollutants of concern into impaired waters. As a point source of oxygen demanding substances, TMDL wasteload allocations (WLAs) for the City of Butler's Wastewater Treatment Facility (WWTF) must ensure attainment and compliance with applicable water quality standards (WQS) per the federal Clean Water Act and implementing regulations [e.g. 40 CFR 130.7(c)]. Reductions in pollutant loading from the City of Butler's WWTF must be achieved in conjunction with reductions in non-point sources of pollutants within the Mound Branch watershed.

The Department understands that resources are limited and that communities are sometimes hard pressed to meet the demands of water and wastewater system improvements. I invite you to contact the Department's Financial Assistance Center to discuss grant and low interest loan options that may be available to the city should wastewater system improvements be necessary. To reach the Financial Assistance Center, you can call (573) 751-1192 and ask for either Mr. Doug Garrett or Ms. Traci Newberry, or email Mr. Garrett at the following e-mail address: doug.garrett@dnr.mo.gov. You can also find them on the web at http://www.dnr.mo.gov/env/wpp/srf/index.html.

Comment #2: *The City is concerned about the expense of installing the required wastewater treatment system equipment that will meet current requirements but may not meet future requirements. The city currently is being offered a temporary operating permit good only through 2012 with no guarantee of future regulatory requirements. It is their belief that this permit is being offered as a guarded measure by MoDNR-WPP rather than issuing the standard 5-year permit.*

A five-year Missouri State Operating Permit (MSOP) for the City of Butler's WWTF was issued on February 11, 2010. The renewed MSOP retained effluent limits for biochemical oxygen demand (BOD) and total suspended solids (TSS) derived using previous stream surveys and modeling results. Additional water quality data for nutrients and updated QUAL2K modeling required for the Mound Branch TMDL have resulted in more stringent WLAs for carbonaceous biochemical oxygen demand (CBOD), TSS, and nutrients. To ensure WQS are attained in Mound Branch, these WLAs must be implemented through the City of Butler's WWTF MSOP.

The Department is required to develop WLAs that are protective of water quality without regard to cost or available treatment technology. Should WLAs result in effluent limitations that are beyond the limits of current treatment technology, the Department may develop a phased approach to TMDL implementation of effluent limitations through the use of the best available treatment technology. Such an approach can be implemented either within the MSOP or through a settlement agreement. As discussed in a December 9, 2010 meeting with the City of Butler, Geosyntec, and the Department, Section 12 (Implementation Plans) of the TMDL document has been revised to include a phased approach to TMDL WLA implementation in the City of Butler's WWTF MSOP. The phased approach will help ensure that only the level of treatment technology necessary to attain applicable WQS will be required.

Comment #3: *The CWC with and through the Osage Valley Resource Conservation and Development Council (OVRCD) has begun the slow process of securing funding for restoration of this watershed as identified in the* ***"The Marais des Cygnes, Marmaton, and Little Osage River Watershed Management Action Plan-2006".*** *The* ***"Mount Branch Watershed Evaluation and Restoration Project-Bates County, Missouri, Section 319 Sub-grant G09-NPS04"*** *is in its beginning phases. While funding has been secured (release of funds pending) for the installation water quality practices, education, and water quality monitoring as major components, it seems odd to use data from several years ago when new data will be available very soon. The project lifespan is 4-years and will not get its first practices installed until the summer or late fall of 2010. It is well known by water quality experts that there is a major lag period between when a practice is installed and documenting water quality benefits. For most non-point water quality benefits it ranges from 10-15 years. Monitoring data under this project will be available within 3-6 months and will continue for remainder of this 4 year project.*

The Department congratulates the CWC and Osage Valley Resource Conservation & Development Council on the achievements of both creating the watershed management plan and securing a 319 grant to proceed with addressing the issues facing Mound Branch. The Mound Branch TMDL is being established at this time in resolution of the TMDL Consent Decree[1] which states the TMDL must be completed by December 31, 2010. The Department believes the data used for the Mound Branch TMDL are of sufficient quality and quantity for TMDL development. As more data becomes available, such as through the Section 319 project noted above, they will be considered and assessed against the goals and reductions found in the TMDL. These future assessments will be beneficial in targeting areas within the watershed where additional reductions may be necessary.

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[1] Consent Decree refers to the 2001 Consent Decree entered in the case of American Canoe Association, et al. v. Carol M. Browner, et al., No. 98-1195-CV-W in consolidation with No. 98 4282-CV-W, February 27, 2001.

Comment #4: *MoDNR has offered in the draft TMDL report to pursue a new standard for dissolved oxygen (DO) levels before the TMDL is finalized or at least by 2012. However the watershed community/CWC have so far not been asked to participate. It appears the regulators are not ready to pursue a revised standard at this time based on conversations over the past few years. The CWC is ready and willing to assist in this endeavor.*

The final Mound Branch TMDL, which will be finalized in early 2010, has been revised to include amended implementation language acknowledging issues regarding low dissolved oxygen (DO) as a natural background condition in streams and rivers in this ecological region. The Department may develop revised DO criteria for Mound Branch and similar streams during a future triennial review of the WQS in 2012 or 2015, if resources are available. Additional monitoring and analysis may determine whether the DO criterion of 5 mg/L is appropriate, or if a new site-specific DO criterion is required.

The Department appreciates the CWC's offer to assist with and be involved in developing revised DO criteria. At the present time, the Department is working with EPA to create a process on how to approach the issue. We will be sure to inform the CWC when the Department is ready to engage stakeholders. Thank you for your willingness to be a part of the process.

Comment #5: *The proposal indicates a 3-year window to improve DO levels but properly installed water quality benefitting practices will not begin to show improved results until approximately 10-15 years following installation*

As now noted in Section 11 of the TMDL, post-TMDL monitoring will be scheduled and conducted approximately three years after the TMDL is approved, or "in a reasonable period of time following any TMDL compliance schedule outlined in the permit and the application of any new effluent limits." The Department has no plans to assess and evaluate the success of TMDL implementation before three years, and will only begin to collect data after post-TMDL implementation has had a chance to result in water quality improvements.

Comment #6: *The citied impairment in the Draft TMDL lists aquatic life for the Mound Branch, but the documents appear to vary from documentation regarding that impairment. The water quality evidence utilized in this draft TMDL assumes the impaired water use but has not been documented with the level of habitat loss. The first evidence that the local watershed residents knew of perceived water quality impairment was when MoDNR-WPP and the Kansas City Regional Office staff met with the CWC to discuss options. The CWC took action as directed by MoDNR partners to rectify the issues and concerns, thus the pending watershed restoration project.*

Mound Branch was first placed on Missouri's 303(d) List of impaired waters in 1998 for ammonia and BOD from the City of Butler's WWTF. Subsequent 303(d) lists, including the recently approved 2008 303(d) List, revised the pollutant of concern to low DO. The impairment

of the Protection of Warm Water Aquatic Life designated use was assessed based upon data of sufficient quality and quantity that met or exceeded the requirements in Missouri's 303(d) listing methodology. The data indicate that Mound Branch is impaired due to non-attainment of the 5 mg/L DO minimum criterion found in rule. A decision of impairment for Mound Branch based on biological criteria has not occurred.

As stated previously, the Department appreciates the efforts of the CWC to develop and implement a watershed restoration project for the Mound Branch watershed.

Comment #7: *There are several questions regarding the livestock data and the validity of the number of livestock in the watershed nutrient contribution assumptions used. We believe the data is old and not representative of this watershed versus the balance of Bates County. Additionally some questions exist regarding the number of wetland acres, row-crop acreage along stream banks, etc. The authors have on occasions in the document checked with sources outside the agency to document facts and conditions (anecdotal); yet when it comes to the small area involved in this impaired water body they fail to utilize local resource staff for a more accurate depiction of the watershed involved. Agencies, such as University of Missouri-Extension, Bates County SWCD, and USDA-NRCS, to name a few, would have far more up-to-date data. This would make it more believable to the local watershed residents and decision makers because many of their local programs are directed by this information detailed.*

The livestock data used to estimate the level of cattle grazing in the Mound Branch watershed is county level data that comes from the 2007 Census of Agriculture published by the United States Department of Agriculture's (USDA's) National Agricultural Statistics Service. This is the most recent and comprehensive agricultural census that is available from USDA. The land use and land cover data used in the Mound Branch TMDL were developed by the Missouri Resource Assessment Partnership (MoRAP), an interagency partnership that includes the U.S. Geological Survey's (USGS) Columbia Environmental Research Center and the University of Missouri–Columbia. This 30-meter land cover classification was published in 2005 and based upon satellite imagery from 2000–2004. The Department believes the MoRAP 2005 coverage is the most accurate and up-to-date land classification available for the State of Missouri.

The MoRAP 2005 land use figures and calculations are the most accurate available, therefore values and percentages for land use and land cover remain unchanged in the Mound Branch TMDL. Follow-up discussions with the CWC via e-mail (December 18, 2009) and fax (December 30, 2009) revealed similar values for land use and land cover which substantiate the decision to leave these values unchanged in the TMDL. Regarding livestock data and information, the Department appreciates the additional information provided by the CWC. This new information has been added to Section 3.2.1 (Runoff from Agricultural Areas) to supplement the information obtained from USDA's 2007 Census of Agriculture.

Comment #8: *The draft TMDL report makes assumptions about pollutants to the impaired stream without documented evidence. It assumes issues with the city yard-waste collection site but in the next breath discounts any potential from 3 commercial sites within the watershed with just as much potential. The tannin runoff from a commercial operation may be as great or greater concern. The same is true from commercial fertilizer mixing and distribution plants for the county. These places have storm water permits yet there is no evidence of these being inspected for accidental spills that may take weeks or months lag time for delivery to a branch stream in the watershed. The locations of these establishments in the Mound Branch watershed while not conclusively contributors, they should not be overlooked within the draft TMDL report regardless of the fact that they have only a stormwater permit. A shovel full of granular fertilizer can send pounds of nutrients to a stream. At the same time, the City of Butler's yard waste site should not be the exclusive contributor. Where is the data?*

An important part of the TMDL process is to inventory all potential sources of the pollutants of concern. It is well documented that storm water originating from urban areas contains total nitrogen, total phosphorus, and TSS in concentrations that may cause or contribute to water quality impairments. While the source inventory section is meant to be comprehensive, additional information from watershed residents and stakeholders is welcome.

To that end, the Department appreciates the additional information provided by the CWC via fax on December 30, 2009. The Department believes the CWC will be instrumental in transmitting this information to citizens and stakeholders as non-point source reductions are implemented within the Mound Branch watershed. The non-point sources of pollutants of concern bulleted in Section 3.2.2 (Runoff from Urban Areas) were observed in the City of Butler and are examples of operations that can be sources of nutrients. Additional information and detail was not supplied as these sources have not been investigated in some time. Inspection and assessment of pollutant contributions from these sources will be part of the TMDL implementation process within the Mound Branch watershed.

Regarding point sources within the watershed, general and storm water permits are issued to operations and activities that discharge pollutants to waters of the state and that can be covered by a single set of requirements. In general, these permits are not considered to contribute to the impairment because low DO is a problem during low-flow conditions and many of these operations discharge in response to storm events. The requirements for these permits include effluent limitations and requirements to install Best Management Practices (BMPs) that control as much as practicable pollutant discharges into nearby water bodies. Inspections to be conducted during TMDL implementation will determine whether additional requirements are needed for facilities holding general and storm water permits within the Mound Branch watershed.

Comment #9: *What are the assumptions used for the waste load model,* ***QUAL2K Model*** *and sub-routines within this and other models? The model(s) and sub-routines may not be well known and commonly accepted. These model sources need to be made known to the public in this document and in what version. An assumption by somebody far away from the source of the watershed is not accurate. A committee comprised of local watershed residents and users would add credibility to the process early in the development of a TMDL.*

QUAL2K is an EPA supported water quality model that simulates the fate and transport of DO and oxygen demanding substances in rivers and streams. The QUAL2K and load duration curve models used in development of pollutant allocations are discussed in Section 8 of the TMDL. A further description of the QUAL2K modeling process is included in Appendix B. In addition, as noted in Section 15 of the TMDL document, the Department has kept a complete administrative record of all data and modeling files, including the QUAL2K input and output files. These files are available to the public at any time upon request.

Comment #10: *The "Reference Streams", Ecological Drainage Units (EDUs), cited in the draft TMDL report to compare Mound Branch stream network is flawed. The similarity is not there in land form, land uses, watershed characteristics, etc. It would appear that the author(s) are attempting to draw conclusions from other sources that are not even representative of Mound Branch Watershed characteristics. We urge the author(s) to visit website:* ***"Biological Criteria for Wadeable/Perennial Streams of Missouri"****, Feb. 2002: Randy Sarver and Stuart Harlan, MoDNR-ALPD, Environmental Services Program: http://www.dnr.mo.gov/env/esp/docs/BiologicalCriteriaforWadeableStreamsofMissouri.pdf and the reports from 2001 and 2007 sponsored by MoDNR on this very topic. Incidentally the reports have not changed during these two periods,* ***"Ozark Stream Class Ecological Archives MO77-010-A2"****, Scott P. Sowa, Gust Annis, Michael E. Morey, and David D. Diamond, 2007. A Gap analysis and comprehensive conservation strategy for riverine ecosystems of Missouri* ***"Ecological Monographs 77:301-334; Appendix B. Map Showing the 17 Ecological Drainage Units (EDUs) of Missouri****; http://esapubs.org/Archive?mono/MO77/010/appendix-B.htm. MoDNRs own documentation reports, the only reference stream for Mound Branch watershed as* ***"Little Drywood Creek, Vernon County, Missouri"****. This draft TMDL did not use any of this streams data to support its claims for restoration. Why?*

Referenced streams listed in the document*:*

- *South Grand River [Archie, MO and Freeman, MO] (Cass County) is a severely channelized muddy bottomed channel with row-crop up to its bank edges and a major flood plain diked;*
- *Muddy Creek Branches (Cass County) has major urbanization with at least 2 large impoundments across the stream in several locations;*
- *Big Creek (Cass, Johnson and Henry Counties) again is not typical of this watershed. It is channelized and diked for waterfowl hunting clubs;*

- *W. Tebo Creek (Henry County) is an abandoned strip mined watershed;*
- *Cedar Creek (Pleasant View, MO); Ozark Stream Class;*
- *Weaubleau Creek, (St. Clair County); Ozark Stream Class;*
- *Brushy Creek (St. Clair Count\y)*

TMDL modeling was completed by EPA using the ecoregion reference concentration approach, rather than the reference stream approach. The TSS targets were derived based on a reference approach that targeted the 25th percentile of TSS measurements collected by the USGS as non-filterable residue in the geographic region in which Mound Branch is located (see Appendix C of the TMDL for a more complete discussion of development of TSS targets). To address nutrient levels of total nitrogen and total phosphorous, the EPA nutrient ecoregion reference concentrations were used (for more information on nutrient reference concentrations see "Ambient Water Quality Criteria Recommendations: Rivers and Streams in Nutrient Ecoregion IX". U.S. Environmental Protection Agency, Washington DC. EPA 822-B-001-019 and "Ambient Water Quality Criteria Recommendations: Rivers and Streams in Nutrient Ecoregion X". U.S. Environmental Protection Agency, Washington DC. EPA 822-B-001-016).

In regard to Little Drywood Creek, the Department is unable to find any mention of this water body being used as a reference stream in the draft TMDL. The Department acknowledges; however, that this reference stream does at times exhibit low DO concentrations below the 5 mg/L minimum criterion. However, modeled DO and nutrient relationships for Little Drywood Creek were not available from which to determine whether the water body would serve as a suitable reference stream for Mound Branch. Therefore, EPA nutrient ecoregion reference concentrations were used to set TMDL nutrient targets for Mound Branch.

Thank you again for your comments and support of the TMDL process. If you have questions or would like to discuss this TMDL further, please contact me at (573) 526-1446, john.hoke@dnr.mo.gov, or by mail at the Missouri Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, Missouri 65102.

Sincerely,

WATER PROTECTION PROGRAM

John Hoke, Chief
TMDL Unit

JH:apl